



# Adafruit Resistor Helper Tie

Written By: caitlinsdad

## TOOLS:

- [Clothes Iron \(1\)](#)
- [Scissors \(1\)](#)
- [hand sewing essentials \(1\)](#)
- [inkjet printer \(1\)](#)
- [punch awl \(1\)](#)
- [seam ripper tool \(1\)](#)

## PARTS:

- [Necktie \(1\)](#)
- [Iron-on print transfers for light or dark material use \(1\)](#)
- [Brass split-end paper fasteners \(1\)](#)
- [clear packaging tape \(1\)](#)
- [Fusible iron-on interfacing or embroidery fabric stabilizer \(1\)](#)

## SUMMARY

Nope, you can't get one there, you gotta make it yourself.

Unless you are one of those who can remember the entire color code for 4- and 5-band marked resistors (test later on how many possible combinations there are; I'm still working on wiring up CAT-5 correctly), you need the help of a reference chart or you can use the handy papercraft [Adafruit Resistor Helper](#). Seeing that it is Father's Day soon, what better time to give the gift of a tie? Of course, for the geek and technically inclined, a hacked tie would be even better.

You can [make a resistor tie from scratch](#) but you can also repurpose old ties too. Do something with those old power ties to make them current.

I am just going to use a tie I found at the dollar store (really \$2, it had a cool sparkly techno vibe in the pattern) and make a few quick mods to implant the papercraft resistor helper.

## Step 1 — Adafruit Resistor Helper Tie



- Take a look at Adafruit's Resistor Helper guide to make the standalone resistor helper.
- Download the PDF of the resistor helper.
- This papercraft resistor calculator was designed by Adafruit with [Matthew Borgatti](#).
- [Adafruit Resistor Helper](#)
- Print out one copy for reference.
- Print out one more to cut up and assemble the color wheels.
- Print one copy out on your iron-on transfer paper. Know how to use your iron-on transfer paper. The one I used is for application on dark materials. It requires that the image not be reversed and it must be printed on the surface that will peel away from the backing sheet. It is applied directly on where you want it to stick.

## Step 2



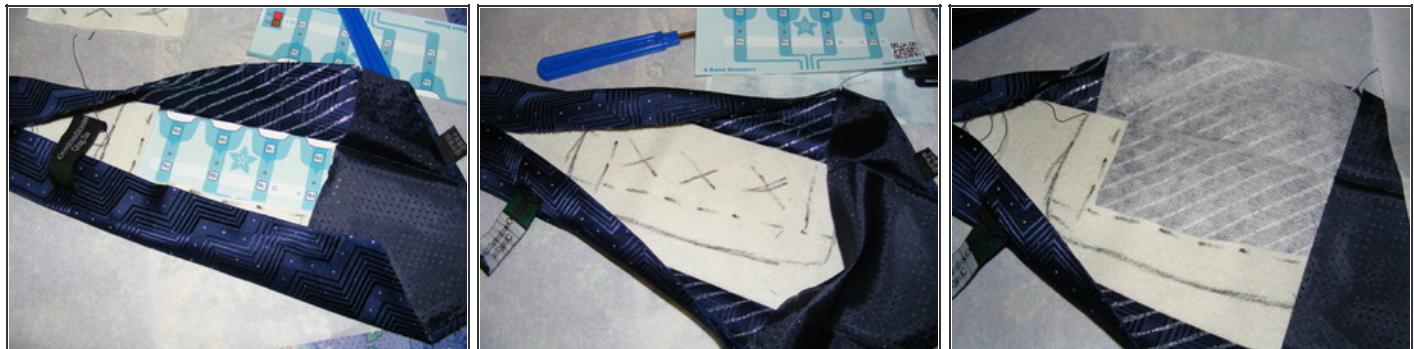
- Follow the instructions on the PDF. The color wheels are paired front and back and are marked in which order they will be assembled into the case.
- You can roughly cut out each pair of color wheels and glue the corresponding parts back to back. Place under a weight like a telephone book to keep them flat while the glue dries.
- When dry, trim close to the edge design.
- You can run the color wheels through a laminator or just apply clear packaging tape over them. This will increase the durability and strength of the color wheels.
- Laminate both sides of the color wheel. Trim off excess tape.
- From the iron-on transfer print, cut out the separate panels for the sides of the resistor helper. You should have two pieces, the 4-band and 5-band sides.

### Step 3



- Like genuine Arduinos, be wary of labeling found on your products.
- Time to start dissecting the tie. Use a seam ripper tool since that is almost as good as a scalpel in working with delicate tie material. Okay, we've got real polyester here instead of silk.
- Break the bar tack that holds the back of the tie together near the bottom. Splay the tie out up to where the tie holder label is. You might need to free up a side of the label too.
- Using one of the resistor holder side panels as a size guide, position it on the tie so that you can see you have access to that much of the tie.
- You can place the resistor helper on either side of the tie. The preference is determined by which hand the wearer will prefer to use to access the thumbwheels.

## Step 4



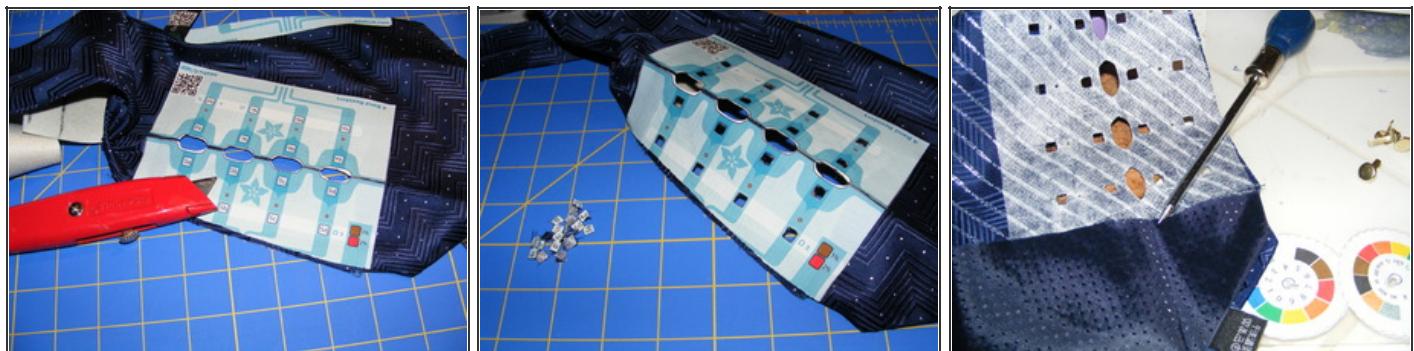
- There is a piece of thick fabric inside that is the interfacing or stiffener for the tie. We need to cut out the portion where the color wheels need to be seen on both sides of the tie.
- Transfer the markings where the color wheel windows will be to the interfacing.
- Cut out that piece of interfacing.
- We need to restore structure to the tie by applying a piece of fusible interfacing to the tie's outer fabric where the original tie interfacing has been removed. This also reinforces the tie fabric so we can cut out the windows for the color and number values. Also, the paper fasteners will be inserted through there.
- Cut a piece of fusible interfacing the size of the side panels. Fold in half and mark the fold so it is easier to see.
- Line the interfacing up with the fold in the edge of the tie. I had to trim the front a bit so it would not interfere with the seam and fabric tie liner at the point.
- Apply heat with a clothes iron set a moderate heat to bond the fusible interfacing.

## Step 5



- Test to see how your iron transfers will work. I cut out the QR code and applied it to the tie label.
- Line up the side panel iron-on transfers on the tie to see where they will be applied.
- On the back of the tie, the transfer bled over the back of the tie seam. I applied it in place and then cut it open after the iron-on transfer cooled. You still need access to the inside of the tie. It will line up nicely when sewn back together.
- It is easier to apply the back panel first because you can line it up by seeing where the interfacing cutout is. Tack in place along the edge first. Place a piece of parchment paper as a cover liner to keep the iron-on transfer from sticking to the iron.
- Fold the rest of the tie in place and complete applying the back panel iron-on transfer.
- Open up the tie and lay it flat. Line up the opposite side panel. Apply iron-on transfer with the clothes iron and parchment paper cover layer.

## Step 6



- Use a sharp razor knife to cut out the color wheel windows and tab openings.
- Ensure that there are no hanging chads so that the count will be accurate.
- Use an awl or something sharp to poke holes for the paper fasteners. Using a drill or drill press would be overkill.

## Step 7



- As suggested, clipping off a bit of the paper fasteners makes them less obtrusive. I used tinsnips which left a rough sharp edge that I had to file and sand off.
- Work the fasteners in place through the tiny holes you poked with the awl.
- Use the awl to poke holes for the fasteners in the color wheels. Have them arranged in the order you will be placing them in the resistor holder. Poking a hole in the center of the color wheel destroys the reference label so have them oriented facing the way they will be installed.
- Refer back to your reference printout one more time to make sure where the color wheels go.
- Mount the color wheels.
- Push the fasteners to the other side of the tie. Split the ends and press flat to secure.

## Step 8



- Nurse, time to sew back up the open seam that was created to access the inside of the tie.
- Here is the completed tie with Adafruit's Resistor Helper.
- The front of the tie is the 4-band resistor reference. On the back is the 5-band resistor reference.

## Step 9



- Proper knot with corporate dimple.
- Engineer knot.
- Impress the gang at karaoke night with your resistor value divining skills.
- Use as a conversation starter or indulge in games of resistor pong.
- Need to decode the color stripes on a resistor? Usually you can say "There is an app for that" but now you can say "There is a tie for that!"
- CAUTION: As with all ties, do not wear when working near machinery, open flames, or eating soup.

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